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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,711	02/05/2002	Joachim Szczyrbowski	LYB3-210.1-Cont	8488

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EXAMINER	
VERSTEEG, STEVEN H	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/067,711	SZCZYRBOWSKI ET AL.	
	Examiner	Art Unit	
	Steven H VerSteeg	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *31-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *31 and 32* is/are rejected.

7)☒ Claim(s) *33 and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 08/959,633.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,169,509 to Latz et al. (Latz) in view of US 5,415,757 to Szcyrbowski et al. (Szcyrbowski) and ***Thin Film Processes*** by Vossen et al. (Vossen).

3. For claim 31, Applicant requires a method for sputter-induced deposition of metal oxide layers by reactive sputtering comprising supplying an electrical output to the plasma discharge by means of at least two electrodes arranged adjacent to one another where the output is selected such that the metal oxide layers are deposited at a growth rate of $\geq$4 nm/s, the substrate is stationary, the AC power is supplied to the electrodes at a frequency of 10-80 kHz, and a transitional area in a hysteresis loop of the p(M) curve between working points with metallic and oxide sputter conditions has a width of less than or equal to 10 sccm.

4. Latz discloses a sputtering process (col. 3, l. 11-21) comprising providing two electrodes **5**, **5a** each connected to AC power (abstract). During the deposition process, metal targets are reactively sputtered in an atmosphere of oxygen to produce a metal oxide (col. 2, l. 29-35). The frequency of the AC power is 1-100 KHz (col. 3, l. 11-14). The substrate does not move (Figure 1). The deposited layer would have high optical quality and be smooth.

5. Latz does not disclose the deposition rate or specify the frequency to be specifically between 10-80 kHz.

6. Vossen discloses that deposition rate is directly proportional to the power applied to the targets such that increasing the power supplied will increase the deposition rate (pg. 61-62). Therefore, the deposition rate is a result effective variable.

7. It would have been obvious to one of ordinary skill in the art at the time the invention was made to deposit the metal oxide at a rate of $\geq$ 4nm/s because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. Szcyrbowski discloses that when AC sputtering, the ideal frequency is 40 kHz because it results in the best quality film produced because the arcing buildup is reduced (col. 5, l. 30-68).

9. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Latz to utilize a frequency of 40 kHz because of the desire to produce the metal oxide film with the best properties.

10. The transitional area in a hysteresis loop having a width of 10 sccm or less is inherent because it is the fact that AC power is used rather than DC power that affects the width of the loop (see pg. 7 of instant specification). Therefore, because 40 kHz AC frequency is obvious, it is inherent that the width would be as claimed by Applicant. Merely because the prior art does not recognize a feature as existing does not mean that the feature does not exist. Here, while Szcyrbowski does not necessarily state the loop width, it is the recognition of the frequency that is the key. The frequency within the range claimed by Applicant is obvious and the loop width would always occur as a result of the AC frequency. Thus, the width is an inherent property.

11. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over ***Reactive alternating current magnetron sputtering of dielectric layers*** by Scherer et al. (Scherer) in view of US 5,415,757 to Szcyrbowski et al. (Szcyrbowski) and ***Thin Film Processes*** by Vossen et al. (Vossen).

12. For claim 32, Applicant requires a method for sputter-induced deposition of metal oxide layers by reactive sputtering wherein an electrical output is supplied to the plasma discharge where the output is selected such that the metal oxide layers are deposited at a growth rate of $\geq$40 nm m/s, the substrate is moved along in front of the targets, the AC power is supplied to the electrodes at a frequency of 10-80 kHz, and a transitional area in a hysteresis loop of the p(M) curve between working points with metallic and oxide sputter conditions to have a width of less than or equal to 10 sccm.

13. Scherer does not disclose the deposition rate for the metal oxides to be $\geq$ 40 nm m/s, but does disclose that the deposition rate achieved for 7kW power applied when forming aluminum oxide to be 3.3 nm (Table 1). Scherer does not disclose the AC power to the electrodes.

14. Vossen discloses that deposition rate is directly proportional to the power applied to the targets such that increasing the power supplied will increase the deposition rate (pg. 61-62). Therefore, the deposition rate is a result effective variable.

15. It would have been obvious to one of ordinary skill in the art at the time the invention was made to deposit the metal oxide at a rate of $\geq$ 40 nm m/s because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

16. Szcyrbowski discloses that when AC sputtering, the ideal frequency is 40 kHz because it results in the best quality film produced because the arcing buildup is reduced (col. 5, l. 30-68).

17. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Scherer to utilize a frequency of 40 kHz because of the desire to produce the metal oxide film with the best properties. The width of the loop would be inherent as noted above.

Response to Amendment

18. All rejections and objections presented in the office action mailed September 12, 2003 are withdrawn in light of the amendment.

Allowable Subject Matter

19. Claims 33 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious over the prior art of record to have a method for sputter-induced deposition of metal oxide layers on substrates by means of reactive sputtering process as claimed by Applicant in claims 33 and 34.

21. Neither Scherer, Latz, Vossen, nor Szcyrbowski disclose or suggest a probe voltage of an oxygen sensor to be an actual value to a control circuit that regulates the sputter process.

General Information

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Palestine Jenkins at (571) 272-1021.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven H VerSteeg
Primary Examiner
Art Unit 1753

shv
March 15, 2004